

ABSTRACT

It has been desired to confine light in a direction which has no period of a photonic crystal with a simpler optical system. An optical device which includes a GI-type photonic crystal slab 4 which includes: a first member which has a distribution of refractive indexes 12 reduced in both directions from an optical axis 20 of incident light as to a first direction vertical to the optical axis 20; and a second member periodically placed in substance among the first members as to a second direction different from the first direction, wherein the distribution of refractive indexes 12 of the first member which relates to the first direction, a thickness which relates to the first direction of the GI-type photonic crystal slab 4, a wavelength of the incident light and an incident end beam spot radius  $\omega_1$  which relates to the first direction inside an incident end 9 of the GI-type photonic crystal slab 4 entered by the light of the incident light are determined to have the incident light substantially confined inside the GI-type photonic crystal slab 4 as to the first direction.